

APPENDICES:

DATA
ON
HISTORICAL FISH STOCKING
AND
1993 SPAWNER SURVEY AND GILLNETTING

Appendix A. Hatchery kokanee releases into Lake Sutherland (source: WDFW unpublished records).

Year	Size	Number	Source
1933	Not recorded	75,000	Lake Crescent Hatchery
1935	1 in	197,000	Lake Crescent Hatchery
1936	1 in	100,000	Lake Crescent Hatchery
1937	1 in	55,000	Lake Crescent Hatchery
1938	1 in	300,000	Lake Crescent Hatchery
1939	1 in	410,000	Lake Crescent Hatchery
1940	1 in	129,000	Lake Crescent Hatchery
1941	1 in	483,000	Lake Crescent Hatchery
1942	1 in	463,000	Lake Crescent Hatchery
1943	1 in	876,000	Lake Crescent Hatchery
1944	1 in	422,000	South Tacoma Hatchery
1945	1 in	500,000	South Tacoma Hatchery
1946	5 in	430,000	South Tacoma Hatchery
1947	1 in	494,000	Aberdeen Hatchery
1949	1 in	182,000	Shelton Hatchery
1951	4,000/lb	492,000	Shelton Hatchery
1953	4,000/lb	502,000	Quilcene Hatchery
1954	4,000/lb	123,000	Aberdeen Hatchery
1955	5,000/lb	244,000	Quilcene Hatchery
1960	Not recorded	355,000	Aberdeen Hatchery
1963	134/lb	52,000	Shelton Hatchery
1964	Not recorded	244,000	Aberdeen Hatchery

Appendix B. Shoreline foot survey results from November 9, 1993.

Highlighted lines show totals to nearest 0.1 mi, rounded where necessary.

<u>Beginning of segment</u>		<u>End of segment</u>		<u>Kokanee</u>	
<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Dead</u>	<u>Redds^B</u>
Boat launch.....	0.00		0.04	5	0
	0.04		0.10	<u>8</u>	<u>1</u>
	<u>0.04</u>		<u>0.10</u>	<u>13</u>	<u>1</u>
	0.10		0.11	4	0
	0.11		0.12	1	0
	0.12		0.17	20	0
	0.17	Unnumbered Creek.....	0.20	<u>35</u>	<u>0</u>
	<u>0.1</u>		<u>0.2</u>	<u>60</u>	<u>0</u>
Unnumbered creek.....	0.20		0.22	47	1
	0.22		0.23	9	0
	0.23		0.26	28	3
	0.26		0.33	<u>117</u>	<u>9</u>
	<u>0.2</u>		<u>0.3</u>	<u>201</u>	<u>13</u>
	0.33		0.35	48	3
	0.35		0.35	41	0
	0.35		0.37	24	0
	0.37		0.38	10	1
	0.38		0.39	33	3
	0.39		0.40	<u>56</u>	<u>0</u>
	<u>0.3</u>		<u>0.4</u>	<u>212</u>	<u>7</u>
	0.40		0.41	18	0
	0.41		0.41	36	0
	0.41		0.42	23	4
	0.42		0.42	13	0
	0.42		0.43	37	2
	0.43	Flagpole.....	0.45	<u>22</u>	<u>10</u>
	<u>0.4</u>		<u>0.45</u>	<u>149</u>	<u>16</u>
Total	0.0		0.45	635	37

^A Defined in glossary.

^B Illustrated in Figure 2.

Appendix C. Results of foot and canoe survey of Lake Sutherland shoreline for kokanee salmon, November 16, 1993. Highlighted lines show totals to nearest 0.1 mi, rounded where necessary.

<u>Beginning of segment</u>		<u>End of segment</u>		<u>Kokanee</u>	
<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Dead</u>	<u>Redds^B</u>
Boat launch.....	0.00		0.01	42	2
	0.01	Unnumbered creek.....	0.02	0	0
Unnumbered creek.....	0.02		0.03	201	2
	0.03		0.05	34	5
	0.05		0.06	5	5
	0.06		0.08	9	2
	0.08		0.10	<u>42</u>	<u>2</u>
	<u>0.0</u>		<u>0.1</u>	<u>333</u>	<u>18</u>
	0.10		0.12	75	4
	0.12		0.15	90	1
	0.15	Unnumbered creek.....	0.20	<u>0</u>	<u>0</u>
	<u>0.1</u>		<u>0.2</u>	<u>165</u>	<u>5</u>
Unnumbered creek.....	0.20		0.24	458	1
	0.24		0.26	61	1
	0.26		0.33	<u>510</u>	<u>9</u>
	<u>0.2</u>		<u>0.3</u>	<u>1,029</u>	<u>11</u>
	0.33		0.33	23	1
	0.33		0.34	23	0
	0.34		0.35	7	0
	0.35		0.36	0	3
	0.36		0.37	50	3
	0.37		0.38	27	0
	0.38		0.38	19	0
	0.38		0.39	6	1
	0.39		0.40	<u>10</u>	<u>1</u>
	<u>0.3</u>		<u>0.4</u>	<u>165</u>	<u>9</u>
	0.40		0.41	61	0
	0.41		0.43	29	9
	0.43		0.44	9	7
	0.44		0.45	37	4
	0.45	Falls Creek.....	0.46	<u>7</u>	<u>0</u>
	<u>0.4</u>		<u>0.46</u>	<u>143</u>	<u>20</u>
Subtotal	0.0		0.5	1,835	63

Appendix C, continued.

<u>Beginning of segment</u>		<u>End of segment</u>		<u>Kokanee</u>	
<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Dead</u>	<u>Redds^B</u>
Falls Creek.....	0.46		0.51	75	7
	0.51		0.53	13	0
	0.53		0.55	0	3
	0.55		0.58	12	0
	0.58	Sunken dock.....	0.60	0	0
	0.5		0.6	100	10
	0.65	Sunken dock.....	0.60	0	0
	0.72		0.65	4	0
	0.6		0.7	4	0
	0.74		0.72	0	1
	0.77		0.74	0	0
	0.79		0.77	3	0
	0.7		0.8	3	1
	1.10		0.79	0	0
	0.8		0.9	0	0
	0.9		1.0	0	0
	1.0		1.1	0	0
	1.13		1.10	0	1
	1.20		1.13	2	0
	1.1		1.2	2	1
	1.30		1.20	1	0
	1.35		1.30	1	0
	1.2		1.3	2	0
	1.38		1.35	5	0
	1.43		1.38	11	0
	1.3		1.4	16	0
	1.45		1.43	2	0
	1.47		1.45	0	0
	1.50		1.47	3	0
	1.4		1.5	5	0
	1.55		1.50	0	0
	1.58		1.55	1	0
	1.60		1.58	0	0
	1.5		1.6	1	0

Appendix C, continued.

<u>Beginning of segment</u>		<u>End of segment</u>		<u>Kokanee</u>	
<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Dead</u>	<u>Redds^B</u>
	1.63		1.60	2	0
	1.65		1.63	1	0
Thompson Point.....	1.68		1.65	2	0
	1.70	Thompson Point.....	1.68	6	0
	1.6		1.7	11	0
	1.72		1.70	5	0
	1.80		1.72	0	0
	1.7		1.8	5	0
	1.82		1.80	1	0
	1.85		1.82	2	1
	1.8		1.9	3	1
	1.97		1.85	0	0
	1.9		2.0	0	0
Maple Grove.....	2.00		1.97	4	0
	2.05	Maple Grove.....	2.00	6	0
	2.09		2.05	0	0
	2.11		2.09	2	0
	2.0		2.1	8	0
	2.13		2.11	2	0
	2.17		2.13	2	0
	2.18		2.17	1	0
	2.20		2.18	0	1
	2.1		2.2	5	1
	2.26		2.20	0	0
	2.30		2.26	0	3
	2.2		2.3	0	3
Opposite Snug Harbor..	2.34		2.30	0	0
	2.36	Opposite Snug Harbor.....	2.34	2	0
	2.43		2.36	0	0
	2.3		2.4	2	0
	2.45		2.43	2	0
	2.47		2.45	2	0
	2.49		2.47	0	0
	2.51		2.49	1	0
	2.4		2.5	5	0

Appendix C, continued.

<u>Beginning of segment</u>		<u>End of segment</u>		<u>Kokanee</u>	
<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Dead</u>	<u>Redds^B</u>
	2.70		2.51	0	0
	2.5		2.6	0	0
	2.6		2.7	0	0
	2.74		2.70	0	1
	2.91		2.74	0	0
	2.7		2.8	0	1
	2.8		2.9	0	0
	2.99		2.91	0	4
	2.9		3.0	0	4
	3.04		2.99	0	0
	3.06		3.04	3	0
Log boom on N. shore..	3.10		3.06	46	0
	3.0		3.1	49	0
N. end flatcar bridge.	3.18	Log boom on N. shore...	3.10	31	1
Fish screen.....	3.21	N. end flatcar bridge..	3.18	20	6
	3.1	N. shore Indian Creek	3.2	51	7
S. end flatcar bridge.	3.25	Fish screen.....	3.21	41	5
L-shape dock, S. shore	3.30	S. end flatcar bridge..	3.25	47	8
	3.2	S. shore Indian Creek	3.3	88	13
	3.41	L-shaped dock, S. shore	3.30	182	2
	3.3		3.4	182	2
	3.46		3.41	2	0
	3.4		3.5	2	0
	3.55		3.46	0	0
	3.61		3.55	1	6
	3.5		3.6	1	6
	3.65		3.61	0	0
	3.66		3.65	1	0
	3.6		3.7	1	0
	3.75		3.66	0	0
	3.79		3.75	1	0
	3.7		3.8	1	0

Appendix C, continued.

<u>Beginning of segment</u>		<u>End of segment</u>		<u>Kokanee</u>	
<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Dead</u>	<u>Redds^B</u>
Unnumbered creek.....	3.90		3.79	0	0
	3.8		3.9	0	0
	3.92	Unnumbered creek.....	3.90	0	1
	4.01		3.92	0	0
	3.9		4.0	0	1
	4.03		4.01	1	0
	4.05		4.03	5	4
	4.07		4.05	0	0
	4.12		4.07	3	4
	4.0		4.1	9	8
	4.16		4.12	4	1
	4.18		4.16	0	3
	4.23		4.18	0	0
	4.1		4.2	4	4
Unnumbered creek.....	4.29		4.23	1	0
	4.30	Unnumbered creek.....	4.29	1	0
	4.2		4.3	2	0
	4.37		4.30	0	0
	4.38		4.37	3	1
	4.43		4.38	0	0
	4.3		4.4	3	1
	4.44		4.43	1	2
	4.48		4.44	0	12
	4.52		4.48	3	0
	4.4		4.5	4	14
	4.53		4.52	9	2
	4.55		4.53	42	0
	4.57		4.55	5	1
	4.59		4.57	2	2
	4.61		4.59	2	1
	4.5		4.6	60	6
	4.64		4.61	6	0
	4.65		4.64	3	0
	4.67		4.65	10	1
	4.70		4.67	2	4
	4.6		4.7	21	5

Appendix C, continued.

<u>Beginning of segment</u>		<u>End of segment</u>		<u>Kokanee</u>	
<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Reference point</u>	<u>Mile^{A,B}</u>	<u>Dead</u>	<u>Redds^B</u>
	4.73		4.70	19	9
	4.75		4.73	3	1
	4.80		4.75	<u>10</u>	<u>5</u>
	4.7		4.8	32	15
	0.00 Boat Launch.....		4.80	0	0
	4.8		4.9	0	0
Total				<u>2,517</u>	<u>167</u>

^A Illustrated in Figure 2.

^B Defined in Glossary.

Appendix D. SCUBA survey of Lake Sutherland shoreline, November 8-9, 1993. Each line represents one free dive or minute of towed dive time.

Date	Dive no.	Shore mile ^A	Bottom		SONAR Traces ^D	Adult kokanee		Redds ^{E,F}
			Depth (ft) ^B	Substrate ^C		Live	Dead ^E	
11/8	1 ^G	0.00 - 0.10	22	G,P,S	0	62	+	0
	2	0.00 - 0.03	24	G	0	0	0	0
		0.03 - 0.07	21	G,V	0	25	1	0
		0.07 - 0.10	33	V,S,C,G	0	1	0	0
		0.10 - 0.13	30	V,C	0	1	0	0
		0.13 - 0.17	22	G,SG	0	10	0	0
		0.17 - 0.20	6	S	0	0	0	0
	3	0.20 - 0.23	6	SG,V	0	0	0	0
		0.23 - 0.25	24	G	0	+	+	?
		0.25 - 0.28	39	PG	0	200	?	+
		0.28 - 0.30	36	G	0	0	0	+
		0.30 - 0.33	33	S,PG,G	0	0	+	0
		0.33 - 0.35	36	PG,G	4	+	?	0
		0.35 - 0.38	36	G	0	0	0	+
		0.38 - 0.40	36	S	0	0	0	0
		0.40 - 0.43	36	SG,S	5	+	0	0
		0.43 - 0.45	35	G,S	0	0	0	0
		0.45 - 0.48	30	S,V,SG	1	0	0	0
		0.48 - 0.50	30	S	0	0	1	0
		0.50 - 0.53	30	S	0	0	1	0
		0.53 - 0.55	29	S	0	0	1	0
		0.55 - 0.58	27	S	0	0	2	0
		0.58 - 0.60	24	S	1	0	0	0
	4	1.75 - 1.79	24	V	1	0	0	0
		1.79 - 1.82	30	V	5	0	0	0
		1.82 - 1.86	30	S	0	0	0	0
		1.86 - 1.90	36	S	2	0	0	0
		1.90 - 1.93	35	S	0	0	0	0
		1.93 - 1.97	39	S	0	0	0	0
		1.97 - 2.00	42	S	2	0	0	0
		2.00 - 2.04	42	S	3	0	0	0
		2.04 - 2.08	33	S	3	0	2	0
		2.08 - 2.11	33	S	1	0	0	0

Appendix D, continued.

Date	Dive no.	Shore mile ^A	Bottom		SONAR Traces ^D	Adult kokanee		Redds ^{E,F}
			Depth (ft) ^B	Substrate ^C		Live	Dead ^E	
11/8	4	2.11 - 2.15	45	V	0	0	0	0
	5	4.80 - 4.78	36	C,S	0	0	0	0
		4.78 - 4.75	24	C,S	0	0	0	0
		4.75 - 4.73	36	C,S	2	2	2	0
		4.73 - 4.71	50	S	0	0	0	0
		4.71 - 4.68	49	S	0	0	0	0
		4.68 - 4.66	30	S	0	0	0	0
		4.66 - 4.64	25	V,S	0	0	0	0
		4.64 - 4.61	44	?	0	0	?	?
		4.61 - 4.59	48	?	1	0	?	?
		4.59 - 4.57	39	?	2	0	?	?
		4.57 - 4.54	34	?	8	0	?	?
		4.54 - 4.52	47	G,C	0	0	0	0
		4.52 - 4.50	42	PG,C,SG	0	+	0	0
		4.50 - 4.47	35	S,V	0	0	1	?
		4.47 - 4.45	24	S	0	0	0	0
		4.45 - 4.43	26	V	0	0	0	0
		4.43 - 4.40	30	V	0	0	0	0
		4.40 - 4.38	36	V	0	0	0	0
		4.38 - 4.36	12	?	0	0	?	?
		4.36 - 4.33	30	?	0	0	?	?
		4.33 - 4.31	58	?	0	0	?	?
		4.31 - 4.29	45	G	1	+	0	0
		4.29 - 4.26	50	S,G	1	+	0	0
		4.26 - 4.24	45	S	2	+	0	0
		4.24 - 4.22	45	G	2	+	+	0
		4.22 - 4.19	51	G	1	+	0	0
		4.19 - 4.17	51	S,G	2	+	0	0
		4.17 - 4.15	36	S,G	0	+	0	0
		4.15 - 4.12	45	S	3	+	0	0
		4.12 - 4.10	45	S	0	0	0	0
11/9	6	0.05 - 0.08	18	S,G	8	100	0	0
		0.08 - 0.10	15	G	1	50	0	+

Appendix D, continued.

Date	Dive no.	Shore mile ^A	Bottom		SONAR Traces ^D	Adult kokanee		Redds ^{E,F}		
			Depth (ft) ^B	Substrate ^C		Live	Dead ^E			
11/9	6	0.10 - 0.13	15	V	0	0	0	0		
		0.13 - 0.15	12	V	6	0	0	0		
		0.15 - 0.18	24	G,C	0	0	0	1		
		0.18 - 0.21	24	SG,V,S	3	50	0	0		
		0.21 - 0.23	6	V	0	0	0	0		
		0.23 - 0.26	6	V,L	0	0	0	0		
		0.26 - 0.28	3	V	0	0	0	0		
		0.28 - 0.31	12	G	12	200	0	M		
		0.31 - 0.34	23	V,S,G	1	0	0	0		
		0.34 - 0.36	24	V,S,G	4	200	+	M		
		0.36 - 0.39	21	S,G,L,SG	2	10	+	M		
		0.39 - 0.41	29	L,S,SG,G,C	7	100	+	0		
		0.41 - 0.44	27	S,G	12	50	+	+		
		0.44 - 0.47	27	G,W,S	11	0	0	+		
		0.47 - 0.49	30	S,G	33	+	0	0		
		0.49 - 0.52	30	S	17	0	0	0		
		11/9	7	0.05 - 0.08	30	?	21	0	0	0
				0.08 - 0.10	27	L,S	5	0	2	0
				0.10 - 0.13	33	S	12	0	+	0
				0.13 - 0.16	33	V,S,L,G,C	9	1	0	0
0.16 - 0.19	33			G,C,S,L	2	0	+	0		
0.19 - 0.21	31			G	0	0	0	+		
0.21 - 0.24	25			S	0	0	+	0		
0.24 - 0.27	12			V,G	1	350	+	+		
0.27 - 0.29	20			V,G	3	0	0	0		
0.29 - 0.32	36			V,S	0	0	0	0		
0.32 - 0.35	40			SG,G	0	50	+	+		
0.35 - 0.37	45			S,G,L	2	0	+	0		
0.37 - 0.40	39			G,SG	7	+	+	0		
0.40 - 0.43	30			S,G,SG	7	30	+	0		
0.43 - 0.46	40			S,L	18	0	0	0		
0.46 - 0.48	45			S,L	10	0	0	0		

Footnotes appear on following page.

Footnotes to Appendix D

- ^A Defined in Glossary and illustrated in Figure 2.
- ^B Measured by SONAR from dive boat to bottom. Divers' depth may vary since divers were towed 100 ft behind boat and boat followed curvature of shoreline.
- ^C Key to substrate types:
C = cobble
G = mixed gravel
S = silt
V = rooted aquatic vegetation
SG = gravel covered with silt
PG = pea gravel
? = bottom not visible
L = logs
W = small woody debris
- ^D Presumed to represent adult kokanee.
- ^E Key to carcass and redd designations:
+ = present but not counted
? = not observable
- ^F M = mass spawning (see Glossary).
- ^G Divers were not towed from initial position.

Appendix E. Lake Sutherland gillnet catch, November 5, 1993.

Kokanee											
Net no.	Max. depth(ft) ^A	Stretched mesh(in)	Sex ^B	Live	Dead	Total	Maturity of sample				
							Im-mature	Mature ^C	Spent ^D		
1	28	0.75	M	1	0	1	0	0	0		
			M	1	0	1	0	0	0		
		2	M	9	0	9	0	9	0		
			F	1	0	1	0	1	0		
		3.25	M	36	0	36	0	29	5		
			F	9	0	9	0	9	0		
		Combined			M	47	30	77	0	38	5
			F	10	0	10	0	10	0		
			Total	57	30	87	0	48	5		
2	51	1.25	M	9	3	12	0	9	0		
			F	4	0	4	0	3	1		
		1.75	M	10	3	13	0	11	1		
			F	5	4	9	0	2	5		
		2	M	13	5	18	0	15	0		
			F	5	4	9	0	5	1		
		2.5	M	42	12	54	0	5	1		
			F	18	4	22	0	5	3		
					SND	0	4	4	3	0	0
		Combined			M	74	34	108	3	40	2
			F	27	19	46	0	10	9		
			SND	0	4	4	3	0	0		
			Total	101	61	162	6	50	11		
3	40	0.75	M	17	0	17	0	16	1		
			F	6	0	6	0	5	1		
		1.25	M	53	0	53	0	50	3		
			F	8	0	8	0	4	4		
		1.75	M	19	0	19	0	19	0		
			F	6	0	6	0	4	2		
		2	M	48	0	48	0	42	6		
			F	22	0	22	0	17	5		
		3.25	M	35	0	35	0	30	2		
			F	10	0	10	0	9	1		
		Combined			M	172	44	216	2	157	12
					F	52	21	73	0	39	13
					Total	224	65	289	2	196	25

Appendix E, continued.

Net no.	Max. depth(ft) ^A	Stretched mesh(in)	Sex ^B	Live	Dead	Total	Maturity of sample			
							Im-mature	Mature ^C	Spent ^D	
Kokanee										
4	49	1.25	M	19	0	19	0	17	2	
			F	3	0	3	0	3	0	
	1.5	M	41	0	41	0	30	6		
		F	11	0	11	0	9	2		
	2	M	50	0	50	0	32	12		
		F	11	0	11	0	11	0		
	2.5	M	55	0	55	0	44	7		
		F	4	0	4	0	3	1		
	3.5	M	34	0	34	0	23	11		
		F	8	0	8	0	2	6		
	Combined			M	199	107	306	1	146	38
				F	37	29	66	0	28	9
			Total	236	136	372	1	174	47	
Nets combined			M	492	215	707	6	381	57	
			F	126	74 ^E	200	0	87	31	
			SND	0	8	8	3	0	0	
			Total	618	297	915	9	468	88	
Cutthroat Trout										
1	28	Combined	M	0	4	4	0	0	0	
			F	0	1	1	0	0	0	
			Total	0	5	5	0	0	0	
2	51	Combined	M	0	2	2	0	0	0	
			F	0	2	2	0	0	0	
			SND	2	5	7	0	0	0	
			Total	2	9	11	0	0	0	
3	40	Combined	F	0	2	2	0	0	0	
4	49	Combined	F	0	1	1	0	0	0	
Nets combined				2	17	19	0	0	0	

^A Bottom depth at end of gillnet farthest from shore. (Gillnet was set perpendicular to shore and anchored so the lead line was near the bottom.)

^B SND = sex not determined.

^C Defined in Glossary

^D Defined in Glossary

^E Estimated number of ripe female mortalities: $74 \times (87 / (87 + 31)) = 55$